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INFLUENCE OF HEALTH LITERACY SKILLS ON THE USE OF INFORMATION TECHNOLOGY RESOURCES FOR SAFE DELIVERY BY PREGNANT WOMEN IN HEALTH CARE CENTERS IN IJEBU ODE, OGUN STATE

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Abstract
This paper examined the influence of health literacy skills on the use of IT resources for safe delivery by pregnant women in selected primary health care centers in Ijebu Ode, Ogun State. This study employed a descriptive survey design thus the researchers obtained the primary data through a questionnaire. Data collected was analyzed using descriptive statistics. The research samples comprised 100 pregnant women who were registered and receiving prenatal care from the randomly selected 10 public primary health care centers in Ijebu Ode. Findings revealed that the level of health literacy skills of pregnant women is determined by the sufficient pregnancy-related information each respondent possesses to manage their health. It indicated that the available IT resources for pregnant women to obtain pregnant-related information for their safe delivery are relatively low; there is a low level of utilization of IT resources by pregnant women. The major increasing challenges and restrictions towards the use of IT resources for the safe delivery of pregnant women are low level of literacy skill, lack of confidence, and IT skills among others. The study recommended health literacy sensitive interventions by health professionals, intensified level of provision, availability, and accessibility of information technology resource, to health professionals as well as pregnant women in primary health care centers by the government and its agencies.

Keywords*:* Health literacy skills, Information Technology (IT) resources, Health Information resources, pregnant women.

Introduction

The role of information technology in health care delivery system in 21st century cannot be over emphasized,. Access to reliable technological tool is essential to successful child birth practice and maternal mortality ratio reduction. According to Ope (2020), Maternal Mortality Ratio (MMR) in several low-and-middle-income countries is unpleasant, with about 34 of worldwide deaths being in Nigeria and India alone. Information is essential for change, meeting people`s health literacy needs and communicating in meaningful ways is key to delivering person-centered care. Acquiring health literacy skills for navigating information resources on pregnancy through Primary Health care Centers (PHCs) and Information Technology (IT) for better knowledge among women of childbearing age can decrease pregnancy-related problems and improve perinatal outcomes.

Health literacy encompasses the knowledge and awareness of one's health concern and the ability to identify, locate and effectively utilize relevant and appropriate health information resources that will address and enhance ones wellbeing and reduce the risk of various illnesses and disorders in this contemporary world. This implies that health literacy affects health decisions made by women during pregnancy (Derya, IIknur and Semiha, 2019). Also according to Ostini and Kairuz (2014), a woman`s knowledge, skills, and confidence will affect the healthcare preferences that she makes during pregnancy and breastfeeding. Health literacy signifies the skill of making decisions about individuals` health, as well as investigating, comprehending, and applying information about health (Barnes, Barclay, McCaffery and Aslani, 2018).

The development of Information Technology (IT) for patient and consumer health applications has been exploding in the past decade, with thousands of websites, hundreds of mobile applications, and dozens of special-purpose devices targeted at the health care market (Bickmore and Paasche-Orlow, 2012). Cohen, Coleman and Abrahams (2015) confirms that Information and Communication Technologies (ICTs) play a vital role in addressing many of the challenges in community-based health care systems and enhancing the quality of life. Health Information Technology (HIT) resources make information available directly to patients through electronic tools including patient portals, mobile apps. Access to computers, mobile-cellular technologies, fixed and mobile broadband, and internet services is crucial to expanding the reach of healthcare services and health information to remote and rural areas. When implemented in the framework of a well-coordinated national health strategy, health information technologies can become valuable tools for the healthcare system, empowering policymakers, health frontline workers, and patients to increase the quality of maternal and child

healthcare provided in all countries. Mobile health technologies have been implemented in many developing countries to address challenges in relation to maternal and child health. It is important to emphasize that information is better disseminated using technology (Adetoro and Okike, 2021).

Information technology resources are not only a support for quality care but also to promote patient education in a timely manner. Hence, the need to investigate the use of information technology resources, health literacy skills required for their use and the influence of these skills among pregnant women for their safe delivery.

Statement of the Problem

Child birth could be threatened as a result of not obtaining necessary information on time despite the various information technology resources available. According to the World Health Organization (WHO), every day, approximately 830 women die from preventable causes related to pregnancy and childbirth. Low health literacy skills are associated with negative outcomes including overall poor health for pregnant women. Research shows the intervention of health IT offers exciting opportunities for health promotion, yet the literacy skills of these IT resources for the healthcare of user's especially pregnant women are rarely examined. There are studies that examined the relationship between health literacy and health outcomes, yet there is a need to determine the use of information technology resources, its specific effects on health literacy, relative to women's reproductive health specifically during pregnancy as a determinant to safe delivery. It is on this note that this research set out to examine the influence of health literacy skills on the use of IT resources for safe delivery by pregnant women in Ijebu Ode.

Objectives of the Study

The following objectives guided this study

i. identify the available IT resources for safe delivery among pregnant women in selected primary health care centres in Ijebu-Ode.
ii. investigate the level of health literacy skills on the use IT resources of pregnant women in selected primary health care centres in Ijebu-Ode.
iii. find out the level of use of the available IT resources for safe delivery among pregnant women in selected primary health care centres in Ijebu-Ode.
iv. identify the constraints towards the use of IT resources among pregnant women for their safe delivery in selected primary health care centres in Ijebu Ode.

Review of Related Literature

Health literacy is important to realizing healthy maternity and impacts the safe delivery of pregnancy through enhancing the quality of health care. Hepburn (2021) established that the capability and competence to recognize and use health information to make knowledgeable choices and decisions is critical to maintaining health. This capability and competence, called health literacy, are affected by culture, language, trust, and the context wherein the information is communicated. Moynihan (2015) defines maternal health literacy as cognitive and social skills that inspire and enable women to acquire, understand, and utilize information in a way that safeguards and promotes the health and health of their children. Kohan (2008) confirms that, Maternal health literacy empowers women to acquire timely prenatal decision making and labor-management training altogether with accepting midwifery interventions and even pain management. In a qualitative study by Lori, Achah and Adanu (2014) that examined the knowledge and notion of pregnant women about health literacy (pregnancy risk symptoms, preparation for childbirth and its complications, and knowledge of neonatal care), the results showed that women were privy to pregnancy risks, but they could not properly interpret and apply the key information provided during prenatal care. Knowing about the level of health literacy is necessary to properly address the information desired by pregnant women. Charoghchian and Esmaily (2017) used the maternal health literacy and pregnancy outcome questionnaire of Mojoyinola (2011) reported that the level of health literacy in pregnant women is at a low level. From studies, Nawabi, Krebs, Vennedey, Shukri, Lorenz and Stock (2021) deduced that adequate access, understanding, and application of health information is vital, especially with regard to high-risk health behaviors and in inclined situations. For instance, despite the existence of evidence-based recommendations and information materials, pregnant women with limited health literacy are less likely to take folic acids during pregnancy or engage in prenatal care at a later gestational age. Since maternal lifestyle during pregnancy influence not just about safe delivery but also about the child health in later years, it is essential to develop approaches to enhance health literacy among pregnant women to keep both mother and child health.

Health Information Technology (HIT) as defined by Yen (2017) is the application of information processing involving both computer hardware and software that deals with the storage, retrieval, sharing, and use of health care information, data, and knowledge for communication and decision making. The use of media and health information technology to improve health literacy is an area that is gaining research attention. Researchers are studying how new technologies, including Internet forums, websites, email, YouTube, text

messaging, and smartphone apps, can be used to improve health of infants and mothers.

O` Brian (2014) and other researchers confirm that pregnant women can use smartphone applications, social networks and remote health monitoring devices, to provide safety, reliability and status information not only about their health but also that of the baby. Specifically, Salihu and Efpraxia *(2019) reported that*, the state government of Plateau state, Nigeria launched the Maternal New-born and Child Health Strategy in 2010 to improve the health of women and children in the state. A key element of this programme is the use of mobile phones to improve health outcomes while increasing citizen participation and accountability. Also, Text 4Baby in Australia; Originally an SMS-based system and now including an app helps expectant mothers obtain essential health information during pregnancy and for several months afterward (Whittaker, Maoff-Stepp, Jordan, Stange, Cash, Meyer 2012). From the studies, it can be inferred that the value of health information depends on its use when needed. It is believed that women often use the Internet to search for information related to pregnancy. Ofosu A (2012) and other researchers found that the Internet is used by women as a means of information, they access it to find out what they need and it is one of the media to the fastest growing to cover a wide range of audiences. It provides information on various health related issues including pregnancy and child development step by step.

Methodology

This study adopted a descriptive survey design. The population of the study comprised of over 300 registered pregnant women receiving prenatal and antenatal care in all the primary health care centers in Ijebu-ode local government areas at the time the research is being carried out. Simple random sampling technique was used to select 100 pregnant women who were registered and receiving prenatal care from the randomly selected 10 public primary health care centers in Ijebu Ode. The questionnaire is divided into two sections, A and B. Section A contains items that sought information on demographic data of the respondent. Section B of the questionnaire solicits responses to the influence of health literacy skills on the use IT resources in light of the stated objectives of the study. Data collection was analyzed using descriptive statistics which include frequency count, mean and standard deviation with the aid of statistical software called Statistical Package for Social Sciences (SPSS). In decision making, any mean lower than 2.50 was rejected and regarded as negative while mean of 2.50 and above was accepted and regarded as positive.

Results

Table 1: Demographic Information of Respondents

Demographic features				
Age range	**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
18-25 years	21	21.0	21.0	21.0
26-35 years	42	42.0	42.0	63.0
36-45 years	25	25.0	25.0	88.0
45 years – above	12	12.0	12.0	100.0
Educational Level				
Primary School Leaving Certificate	11	11.0	11.0	11.0
SSCE	26	26.0	26.0	37.0
OND	24	24.0	24.0	61.0
HND	20	20.0	20.0	81.0
BSC	11	11.0	11.0	92.0
Others	8	8.0	8.0	100.0
Employment Status				
Unemployed	26	26.0	26.0	26.0
Employed	23	23.0	23.0	49.0
Self-employed	51	51.0	51.0	100.0
Total	**100**	**100.0**	**100.0**	

It can be deduced from table 1 that most of the respondents are between the age of 26-35, highest percent of the respondents are SSCE holders and largest number of the respondents are self-employed.

Table 2 Level of health literacy skills on the use of IT resources of pregnant women in Ijebu-Ode.

N=100

S/N	Items	Mean	Std. Deviation
1	I have sufficient pregnancy-related information to manage my health	3.30	0.927
2	I can effectively navigate online healthcare system	3.19	0.918
3	I have ability to actively engage with online healthcare specialists	3.21	0.924
4	I have ability to find good and useful health information sources on various stages of pregnancy	3.12	0.956
5	I understand pregnancy-related information well enough to know what to do	3.17	0.888
6	I can evaluate and verify the right sources of online pregnancy-related information	2.99	1.000
7	I acquire pregnancy-related information from radio and television programmes	3.00	0.964
8	I access information regarding pregnancy through my computer or laptop	2.85	0.989
9	I have applications on my Smart phone/ Mobile Phone/Tablet where I access pregnancy related information	2.77	1.053
10	I acquire information from e-books, videos through online health databases, websites, YouTube etc.	2.74	1.084
11	I receive pregnancy related information via E-mails/SMS	2.50	1.087
12	I acquire information from other pregnant women through discussions on online platforms such as WhatsApp, telegram etc.	2.74	0.981
13	I obtain information on pregnancy through Blogs and other social media like Facebook, Instagram etc.	2.59	0.900
14	I connect to Internet/modems/network access points/hotspots to get pregnancy-related information.	2.82	1.038
15	I engage in online seminars and interact with online healthcare providers	2.44	1.028

From the above table, the results revealed that item 1, which stated that respondents have sufficient pregnancy-related information to manage their health has the highest mean score of 3.30(SD= 0.927), while item 3, which stated that respondents have ability to actively engage with online healthcare specialists has a mean score of 3.21(SD= 0.924), followed by item 2 which stated that respondents can effectively navigate online healthcare system which has a mean score of 3.19(SD= 0.918), followed by item 5 which showed that respondents understand pregnancy-related information well enough to know what to do has a mean score of 3.17 (SD= 0.888), while item 14 which stated that respondents connect to Internet/modems/network access points/hotspots to get pregnancy-related information which has the mean score of 2.82 (SD= 1.038), while item 9 which stated that respondents have Smart phone/ Mobile Phone/Tablet where to access information on pregnancy has the mean score of 2.77 (SD= 1.053), followed by item 10 which showed that respondents acquire information from e-books, videos through online health databases, websites, YouTube etc. has a mean score of 2.74 (SD= 1.084),

The test of norm was conducted to determine the health literacy skill on the use of IT resources by pregnant women in Ijebu ode and the overall mean for the health literacy skill of pregnant women is 2.86 (SD- 0.49) which is greater than 2.50 but not up to 3.00 which is an indication that the health literacy skill possessed by the pregnant women is moderate. This reveals that there is a certain level of enthusiasm among the respondents on the use of IT resources to obtain information about their health. The implication of this research question is that the level of health literacy skills of pregnant women is determined by the sufficient pregnancy-related information each respondent possesses to manage their health.

Table 3: Available IT resources for safe delivery among pregnant women

N=100

S/N	Items	Mean	Std. Deviation
1	Mobile Phones	1.66	0.476
2	Computers and laptops	1.40	0.492
3	Internet facilities/modems/network access points/hotspots	1.62	0.488
4	Tablets/Smart phones	1.54	0.521
5	E-books	1.54	0.501
6	E-mails/SMS	1.56	0.499
7	Discussions on online platforms via WhatsApp, telegram etc.	1.53	0.502
8	YouTube	1.54	0.501
9	Blogs	1.46	0.501
10	Online seminars	1.52	0.502
11	Electronic Health Record (HER) software	1.45	0.500
12	E-prescribing software	1.47	0.502
13	Personal health record software	1.50	0.503
14	Athena health	1.50	0.503
15	CareCloud	1.33	0.473
	Total	22.62	9.892
	Grand Total	1.508	0.162

Table 3 revealed available the IT resources for safe delivery among pregnant women are mobile phones (mean score= 1.66/SD= 0.476), internet facilities/modems/network access points/hotspots (mean score of 1.62/SD=

0.488), use of E-mails/SMS (mean score= 1.56/SD= 0.499), use of tablets/smart phones (mean score= 1.54/SD= 0.521), E-books (mean score= 1.54 /SD= 0.501), YouTube (mean score= 1.54/SD= 0.501), Discussions on online platforms via WhatsApp, telegram etc. (mean score=1.53/SD= 0.502), online seminars (mean score= 1.52/SD= 0.502), personal health record software (mean score=1.50/SD= 0.503), E-prescribing software (mean score= 1.47/SD= 0.502), Blogs (mean score=1.46/SD= 0.501), utilization of Electronic Health Record (HER) software (mean score=1.45/SD= 0.500), computers and laptops (mean score= 1.40/SD= 0.492) and CareCloud (mean score= 1.33/SD= 0.473). The grand total mean score was 1.508 (0.162). The grand total mean score was 1.508 (0.162).

The implication of this research question indicates that the available IT resources for pregnant women to obtain pregnant related information for their safe delivery are relatively low and negative.

Table 4: Level of use of available IT resources for safe delivery among pregnant women

N=100

S/N	Items	Mean	Standard Deviation
32	Mobile Phones	2.87	0.981
33	Computers and laptops	2.62	0.940
34	Internet facilities/modems/network access points/hotspots	2.66	0.987
35	Tablets/Smart phones	2.60	1.015
36	E-books	2.52	0.962
37	E-mails/SMS	2.50	1.106
38	Discussions on online platforms via WhatsApp, telegram etc.	2.53	1.000
39	YouTube	2.34	1.103
40	Blogs	2.32	1.043
41	Online seminars	2.28	1.134
42	Electronic Health Record (HER) software	2.40	1.035
43	E-prescribing software	2.36	1.115
44	Personal health record software	2.38	1.062
45	Athena health	2.42	1.084
46	CareCloud	2.13	1.160
	Total	36.93	15.727
	Grand Total	**2.462**	**1.048**

Item 32 which stated the use of mobile phones has the highest mean score of 2.87(SD= 0.981), while item 34, which stated the respondents use of internet facilities/modems/network access points/hotspots has a mean score of 2.66 (SD= 0.987), followed by item 33 which indicates use of Computers and laptops has a

mean score of 2.62 (SD= 940), followed by item 35 which showed that respondents use of tablets/smart phones has a mean score of 260 (SD=.1.015), while item 38 which stated discussions on online platforms via WhatsApp, telegram etc. has the mean score of 2.53 (SD= 1.000), followed by item 36 which showed the use of e-books has a mean score of 2.52 (SD= 0.962), item 37 which stated that respondents use of e-mails/sms which has the mean score of 2.50 (SD= 1.106), while item 46 which stated the use of CareCloud has the lowest mean score of 2.13 (SD= 1.160) followed by item 41 which indicated access online to seminars has a lower mean score of 2.28 (SD= 1.134), while item 39 which stated the level of respondents utilization of blogs has the mean score of 2.32 (SD= 1.043), followed by item 43 which showed the use of E-prescribing software has a mean score of 2.36 (SD= 1.115), while item 44 which stated that respondents use of Personal health record software has the mean score of 2.38 (SD= 1.062), while item 42 which stated respondents use of Electronic Health Record (HER) software has the mean score of 2.40 (SD= 1.035) and item 45 which indicated the level of us of Athena health also has a lower mean score of 2.42 (SD=1.084). The grand total mean score was 2.462 (1.048).

The above analysis infers that the level of utilization of IT resources by pregnant women is significantly low and negative. Most of the IT resources are rarely utilized.

Table 5: Constraints towards the use of IT resources among pregnant women

N=100

S/N	Item	Mean	Std. Deviation
47	Lack of awareness of IT resources for pregnant Women	1.76	0.429
48	Lack of IT skills	1.55	0.500
49	Health information sources for pregnant women are not easily accessible	1.62	0.488
50	Poor internet connectivity	1.65	0.479
51	Non reliance on online/internet resources	1.66	0.476
52	Technophobia	1.59	0.494
53	Cost of procurement of IT facilities	1.63	0.485
54	Lack of confidence	1.52	0.502
55	Lack of motivation	1.59	0.494
56	Fear of what is known	1.62	0.488
57	Low level of literacy	1.57	0.498
58	Low level of internet self-efficacy	1.59	0.494
59	High cost of subscription	1.65	1.067
	Total	21.00	9.285
	Grand Total	**1.615**	**0.184**

Results in table 5 revealed that the constraints towards the use of it resources among pregnant women **are** lack the awareness of IT resources for pregnant women (mean score= 1.76 /SD= 0.429), non-reliance on online/internet resources (mean score of 1.66/SD= 0.476), poor internet connectivity (mean score of 1.65/SD= .0479), high cost of subscription (mean score= 1.65/SD=1.067), cost of procurement of IT facilities (mean score= 1.63/SD= 0.485), health information sources for pregnant women are not easily accessible (mean score= 1.62 /SD= 0.488), fear of what is known (mean score= 1.62 /SD= 0.488), technophobia (mean

score= 1.59/ SD= 0.494), lack of motivation (mean score= 1.59/SD= 0.494), low level of internet self-efficacy (mean score= 1.59 /SD= 0.494), low level of literacy (mean score= 1.57/SD= 0.498), lack of IT skills (mean score= 1.55/SD= 0.500), lack of confidence (mean score= 1.52/SD= 0.502) which is the lowest mean score. The grand total mean score was 1.615 (0.184).

The implication of this research question is that there are increasing challenges and restrictions towards the use of IT resources for the safe delivery of pregnant women. The major challenges are the low level of literacy skill, lack of confidence and IT skills among the respondents.

Discussion of Findings

The study showed that there is an increasing level of health literacy skills on the use of IT resources by pregnant women. The level of literacy skills is determined by the sufficient pregnancy-related information each pregnant women possess to manage their health through information technology resources. These findings agree with the study of Derya, IIknur and Semiha (2019) which emphasized that pregnancy is a period in which women avail of healthcare services most frequently and are open to learning the knowledge and behaviors concerning health, this period can be considered an opportunity for increasing health literacy level. Although, the researchers considers the positive rate of literacy skills of the pregnant women more as interest because the other findings in this research work discovered issues with availability and accessibility of IT resources among pregnant women.

The study also showed that there is low level of available information technology resources for pregnant women to obtain pregnancy-related information to manage their health for their safe delivery. This result disagrees with the study of Rodger (2013)whose study found high levels of access and availability of IT resources among pregnant women. IT resources indicated in this study such as mobile phones, smart phones, computers/laptops, internet facilities, discussions on online platforms, email/SMS, Youtube, blogs, software applications such as Electronic health record (EHR), Athena health among others correlates with the study of Fisher and Clayton (2012) who identified that email, texting, micro blogging and smartphone applications can be used to increase health engagement and improve health outcomes. However, they caution that there is a lack of evidence illustrating the effectiveness of such technologies. In particular, they stated that future studies need to consider patient's media preferences and their level of interest in the use of social media for health care.

The study revealed that the level of utilization of IT resources by pregnant

women is low. Most of the IT resources are rarely utilized as. Pregnant women have varying levels of access to IT and they use them in diverse ways for different purposes. This agrees with O. Mara (2012) and Comer and Grassley (2010) that different populations use IT resources in diverse ways and have different information seeking habits.Additionally, even the commonest of IT resources in this study which is mobile phone is not used by all population in the same way. For example, in the study of Rodger, Wilmore, Humphreys,Flabouris andClifton(2013), Forty per cent of women reported the use of at least one pregnancy-related smartphone app, with some participants describing them as being more relevant and useful to them than other forms of health information technology compared to this study whose common use of IT resources is sixty percent.

Finally, the study showed that constraints towards the use of IT resources by pregnant women for safe delivery by pregnant women are majorly low literacy skill, lack of confidence and IT skills among the respondents. This finding is line with Rodger et al (2013) which noted that not all women have the digital and health literacy skills to use these technologies to search for information. Rodger et al (2013) also identified that women frequently placed a very low level of trust in websites and online information which agree with this study as lack of confidence seem to be major challenge with the lowest mean score

Conclusion

Availability and use of adequate health information technology resources among pregnant women will no doubt improve the level of health care delivery and wellness. The findings and their interpretations in this study had revealed the need to make use of health information technology resources for a range of purposes, yet these resources are not readily available as should be the case in major health care centers in Ijebu Ode, Nigeria.

Recommendations

i. There is the need for the government through the ministry of education and the primary health care board to encourage the use of modern technologies e.g. emails, blogs smart phones apps etc. in various primary health centres such that the availability of these resources will encourage and improve the level of health literacy skills of the regular users.
ii. Government and its agencies should make funds available for the Primary Health care centers to enable them to procure modern equipment that will enhance effective and efficient use of modern IT resources so as to make information dissemination to the pregnant women much easier and

available

iii. Also, various activities that will further improve the level of health literacy of the pregnant women in the various primary health centres should be provided and made available.

iv. Finally, student of medical and Health Sciences, librarianship and Health information science should be trained to access health literacy for patients' specifically pregnant women and should be acquainted with the vast array of existing health information technology resources and pregnancy utilization patterns.

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